CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE SOUTH FORK CUMBERLAND RIVER WATERSHED

5.1. BACKGROUND. The Watershed Approach relies on participation at the federal, state, local and nongovernmental levels to be successful. Two types of partnerships are critical to ensure success:

- Partnerships between agencies
- Partnerships between agencies and landowners

This chapter describes both types of partnerships in the South Fork Cumberland River Watershed. The information presented is provided by the agencies and organizations described.

5.2. FEDERAL PARTNERSHIPS.

5.2.A. Natural Resources Conservation Service. The Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture, provides technical assistance, information, and advice to citizens in their efforts to conserve soil, water, plant, animal, and air resources on private lands.

Performance Results System (PRS) is a Web-based database application providing USDA Natural Resources Conservation Service, conservation partners, and the public fast and easy access to accomplishments and progress toward strategies and performance. The PRS may be viewed at http://prms.nrcs.usda.gov/prs. From the opening menu, select "Reports" in the top tool bar. You will select the time period that you are interested in and the conservation treatment of interest on the page that comes up. Depending on the time period of interest, you will have various report options to choose from, such as location, reporting period and program involved in the reporting. You may be required to "refresh" the page in order to get the current report to come up.

The data can be used to determine broad distribution trends in service provided to customers by NRCS conservation partnerships. These data do not show sufficient detail to enable evaluation of site-specific conditions (e.g., privately-owned farms and ranches) and are intended to reflect general trends.

Conservation Practice	Feet	Acres	Number
Conservation Buffers	42,400	17	
Erosion Control		1,316	
Nutrient Management		10,945	2
Pest Management		10,855	30
Grazing / Forages	99,432	9,912	
Tree and Shrub Practices		3,921	
Tillage and Cropping		990	
Waste Management Systems			13
Wildlife Habitat Management		4,531	
Water Supply	6,200		11

Table 5-1. Landowner Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from PRMS for October 1, 2001 through September 30, 2005 reporting period. More information is provided in Appendix V.*

5.2.B. United States Geological Survey – Tennessee Water Science Center Programs. The United States Geological Survey (USGS) provides relevant and objective scientific information and data for public use in evaluation of the quantity, quality, and use of the Nation's water resources. National USGS water resource assessments include the National Streamflow Information Program (http://water.usgs.gov/nsip/), National Atmospheric Deposition Network (http://bqs.usgs.gov/acidrain/), the National Stream Quality Accounting Network (http://water.usgs.gov/nasqan/), and the National Water-Quality Assessment Program (http://water.usgs.gov/nawqa). For a national overview of USGS water resources programs, please visit http://water.usgs.gov. Specific information on the Upper and Lower Tennessee River NAWQA study units can be found at http://tn.water.usgs.gov/lten/tenn.html .

In addition to National assessments, the USGS also conducts hydrologic investigations and data collection in cooperation with numerous Federal, State, and local agencies to address issues of National, regional, and local concern. Hydrologic investigations conducted by the USGS Tennessee Water Science Center address scientific questions pertaining to five general thematic topics:

1. Water Use and Availability,
2. Landforms and Ecology,
3. Watersheds and Land Use,
4. Occurrence, Fate, and Transport of Contaminants, and
5. Floods and Droughts.

In support of these investigations, the USGS Tennessee Water Science Center records streamflow continuously at more than 100 gaging stations, makes instantaneous measurements of streamflow at numerous other locations as needed or requested, monitors ground-water levels Statewide, and analyzes the physical, chemical, and biologic characteristics of surface and ground waters. In addition, the Water Science Center compiles annual water-use records for the State of Tennessee and collects a variety of data in support of National USGS baseline and other networks. More information pertaining to USGS activities in Tennessee can be accessed at http://tn.water.usgs.gov .

USGS Water Resources Information on the Internet. Real-time and historical streamflow, water-level, and water-quality data at sites operated by the USGS Tennessee Water Science Center can be accessed on-line at http://waterdata.usgs.gov/tn/nwis/nwis . Data can be retrieved by county, hydrologic unit code, or major river basin using drop-down menus on the web page. For specific information or questions about USGS streamflow data, contact Donna Flohr at (615) 837-4730 or dfflohr@usgs.gov . Recent USGS Tennessee Water Science Center publications can be accessed by visiting http://tn.water.usgs.gov/pubpg.html . A searchable bibliographic database is also provided for locating other USGS reports and products addressing specific scientific topics.

5.2.C. U.S. Fish and Wildlife Service. The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. Sustaining our nation's fish and wildlife resources is a task that can be accomplished only through the combined efforts of governments, businesses, and private citizens. The U.S. Fish and Wildlife Service (Service) works with State and Federal agencies and Tribal governments, helps corporate and private landowners conserve habitat, and cooperates with other nations to halt illegal wildlife trade. The Service also administers a Federal Aid program that distributes funds annually to States for fish and wildlife restoration, boating access, hunter education, and related projects across America. The funds come from Federal excise taxes on fishing, hunting, and boating equipment.

Endangered Species Program

Through the Endangered Species Program, the Service consults with other federal agencies concerning their program activities and their effects on endangered and threatened species. Other Service activities under the Endangered Species Program include the listing of rare species under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended: 16 U.S.C. 1531 et seq.) and the recovery of listed species. Once listed, a species is afforded the full range of protections available under the ESA, including prohibitions on killing, harming or otherwise taking a species. In some instances, species listing can be avoided by the development of Candidate Conservation Agreements, which may remove threats facing the candidate species, and funding efforts such as the Private Stewardship Grant Program. The federally endangered gray bat (*Myotis grisescens*) and Indiana bat (*Myotis sodalis*), as well as numerous federally endangered mussel species, occur in the Big South Fork Cumberland River Watershed.

On August 31, 2004, the Service designated critical habitat (Federal Register Volume 69, No. 168) in the Big South Fork Cumberland River Watershed for the federally endangered Cumberland elktoe (*Alasmidonta atropurpurea*), Cumberlandian combshell (*Epioblasma brevidens*), purple bean (*Villosa perpurpurea*), rough rabbitsfoot (*Quadrula cylindrical strigillata*), and oyster mussel (*Epioblasma capsaeformis*). This designation encompasses 95 river miles and consists of the following stream reaches: 27 river miles of the Big South Fork of the Cumberland River main stem from its confluence with Laurel Crossing Branch downstream of Big Shoals, McCreary County, Kentucky, upstream to its confluence with the New River and Clear Fork, Scott County, Tennessee; 7 river miles of North White Oak Creek from its confluence with the Big South Fork upstream to Panther Branch, Fentress County, Tennessee; 9.0 river miles of the New River from its confluence with Clear Fork upstream to U.S. Highway 27, Scott County, Tennessee; 25 river miles of Clear Fork from its confluence with the New River upstream to its confluence with North Prong Clear Fork, Morgan and Fentress Counties, Tennessee; 6 river miles of White Oak Creek from its confluence with Clear Fork upstream to its confluence with Bone Camp Creek, Morgan County, Tennessee; 4 river miles of Bone Camp Creek from its confluence with White Oak Creek upstream to Massengale Branch, Morgan County, Tennessee; 9.0 river miles of Crooked Creek from its confluence with Clear Fork upstream to Buttermilk Branch, Fentress County, Tennessee; and 9 river miles of North Prong Clear Fork from its confluence with Clear Fork upstream to Shoal Creek, Fentress County, Tennessee.

The main stem of the Big South Fork currently supports the best remaining Cumberlandian combshell population in the Cumberland River. For a complete listing of endangered and threatened species in Tennessee, please visit the Service's website at http://cookeville.fws.gov.

Recovery is the process by which the decline of an endangered or threatened species is stopped and reversed, and threats to the species' survival are eliminated, so that long-term survival in nature can be ensured. The goal of the recovery process is to restore listed species to a point where they are secure and self-sustaining in the wild and can be removed from the endangered species list. Under the ESA, the Service and National Marine Fisheries Service were delegated the responsibility of carrying out the recovery program for all listed species.

In a partnership with the Tennessee Chapter of The Nature Conservancy (TNC), Tennessee Wildlife Resource Agency (TWRA), and Tennessee Department of Environment and Conservation (TDEC) Division of Natural Heritage, the Service developed a State Conservation Agreement for Cave Dependent Species in Tennessee (SCA). The SCA targets unlisted but rare species and protects these species through a suite of proactive conservation agreements. The goal is to preclude the need to list these species under the ESA. This agreement covers middle and eastern Tennessee and will benefit water quality in many watersheds within the State.

In an effort to preclude the listing of a rare species, the Service engages in proactive conservation efforts for unlisted species. The program covers not only formal candidates but other rare species that are under threat. Early intervention preserves management options and minimizes the cost of recovery.

Partners for Fish and Wildlife Program

The U.S. Fish and Wildlife Service established the Partners for Fish and Wildlife Program to restore historic habitat types which benefit native fishes and wildlife. The program adheres to the concept that restoring or enhancing habitats such as wetlands or other unique habitat types will substantially benefit federal trust species on private lands by providing food and cover or other essential needs. Federal trust species include threatened and endangered species, as well as migratory birds (e.g. waterfowl, wading birds, shorebirds, neotropical migratory songbirds).

Participation is voluntary and various types of projects are available. Projects include livestock exclusion fencing, alternate water supply construction, streambank stabilization, restoration of native vegetation, wetland restoration/enhancement, riparian zone reforestation, and restoration of in-stream aquatic habitats.

HOW TO PARTICIPATE ...

- Interested landowners contact a Partners for Fish and Wildlife Biologist to discuss the proposed project and establish a site visit.
- A visit to the site is then used to determine which activities the landowner desires and how those activities will enhance habitat for trust resources. Technical advice on proposed activities is provided by the Service, as appropriate.
- Proposed cost estimates are discussed by the Service and landowner.
- A detailed proposal which describes the proposed activities is developed by the Service biologist and the landowner. Funds are competitive, therefore the proposal is submitted to the Service's Ecosystem team for ranking and then to the Regional Office for funding.
- After funding is approved, the landowner and the Service co-sign a Wildlife Extension Agreement (minimum 10-year duration).
- Project installation begins.
- When the project is completed, the Service reimburses the landowner after receipts and other documentation are submitted according to the Wildlife Extension Agreement.

For more information regarding the Endangered Species and Partners for Fish and Wildlife programs, please contact the Cookeville Ecological Services Field Office at 931/528-6481 or visit their website at http://*cookeville.fws.gov*.

5.2.D. National Park Service.

Aquatic resources in the Big South Fork National River and Recreation Area in relation to the Geologic Environment

The surface water resources of the Big South Fork National River and Recreation Area (BISO) are the single most important resource of the park. The conservation of the water resources, preservation of rare and endangered aquatic biota, recreational use of the Big South Fork of the Cumberland River, and economical development of the area are established in the enabling legislature of the Big South Fork National River and Recreation Area and all are dependent on maintaining high quality of surface water in the Big South Fork and tributaries. The water quality of tributary streams has been impacted by land use practices in the watershed. The effect of the impact has not been fully defined, but the decrease in water quality of the tributary streams can directly impact the Big South Fork and adversely affect the conditions that make the area unique.

Drainage of the Plateau is characteristically dendritic in pattern. Major drainage systems of the Plateau may be divided into two principal groups, consisting of those that are tributary to the Cumberland River system and those that are tributary to the Tennessee River system. The Cumberland River tributaries include the Caney Fork, Obey, Wolf, Big South Fork, and Elk Rivers as well as Jellico Creek. Those of the Tennessee River include the Tennessee, Sequatchie, Emory, Clinch, and Elk Rivers as well as Battle Creek (Ferguson and Pace 1981: 3). Several of these drainages actually drain relatively small portions of the Plateau. However, the Emory, Big South Fork, and Caney Fork Rivers drain in excess of 20% of the area defined, a combined total area of over 7000 square kilometers. The drainage of the Big South Fork of the Cumberland River contains approximately 3200 square kilometers of the Plateau or roughly 24% of the total area defined within the study unit. Dissecting the plateau are numerous deep gorges that form prominent cliffs along their perimeters.

The Cumberland Plateau aquifer system consists of Pennsylvanian sandstones, conglomerates, shales, and coals which underlie the Cumberland Plateau in Tennessee. Major water-bearing zones occur within the sandstones and conglomerates in interconnected fractures. The water-bearing formations are separated by shale and siltstone that retard the vertical circulation of ground water. The Pennington Formation serves as the base of this aquifer system and is an effective confining unit.

The Cumberland Plateau aquifer system is an important water source for the Cumberland Plateau. Wells and springs from the aquifer system supply most of the rural domestic and public drinking-water supplies. Water from wells drilled into the Cumberland Plateau aquifer system is generally of good to excellent quality.

One of the world's richest assemblages of temperate freshwater fish once inhabited the Cumberland River (Starnes and Etnier, 1986) into which the Big South Fork River flows. However, impoundment and coal-mining related impacts have made the Cumberland River one of the Nation's most severely altered river systems (Tennessee Valley Authority, 1971).

The Big South Fork region has been extensively mined for coal since the turn of the century with some mines still operating today in the Big South Fork watershed. These mining activities created at least 120 underground entries within the BISO that are clustered along the various coal seam outcroppings in the steep slopes of the Big South Fork gorge. The waste materials from these mines were generally deposited in uncontrolled dumps near the mines (Muncy and Buckner, 1985). Surface and ground water that comes in contact with these mine spoils or discharges directly from the mines is often acidic and commonly has elevated concentrations of iron, manganese, aluminum, and zinc. Many of the tributaries to the Big South Fork have these sources of contaminated mine drainage (CMD) within their watersheds.

Many aquatic species that once existed throughout major portions of the Cumberland River now exist only as isolated remnant populations (Neves and Angermeier, 1990). Eight fish and 24 mussel species in the Cumberland River basin are listed as endangered species, and numerous other aquatic species are currently considered candidates for Federal listing as endangered species. CMD into the Big South Fork River is partly responsible for the reduction in lotic and benthic diversity in the Big South Fork River. There are also over 300 oil and gas wells in the park's boundary. Oil and gas operations that discharge salt water to nearby streams cause the most degradation to water quality.

The tributary streams of the Tennessee and Cumberland River basins contain freshwater mussel species that are endemic to the southern Appalachian Mountains and the Cumberland Plateau region. Ortmann referred to these species as "Cumberlandian," and this region became known as one of the chief centers of freshwater mussel speciation. Ortmann (1924) defined the Cumberlandian region to include the drainages of the Tennessee River system from the headwaters to the vicinity of Muscle Shoals, in Colbert and Lauderdale Counties, Alabama; and the Cumberland River system from the headwaters to the vicinity of Clarksville, Montgomery County, Tennessee (Ortmann, 1925). Of the 90 species of unionids found in the Tennessee River, 37 are Cumberlandian, as are 27 of the 78 species found in the Cumberland River. These two assemblages contain the largest number of unionid species found in any of the world's rivers (Johnson, 1980). Of the 23 American freshwater mussel species listed as endangered by the U.S. Department of Interior, 13 are members of the Cumberlandian faunal group.

Unfortunately, the high diversity has translated into a high proportion of imperiled species. The Cumberlandian Region has the dubious distinction of having by far the highest number of imperiled mussels of any major region in the country (NatureServe 1998). Currently, 34 mussels known from the region are federally protected under the Endangered Species Act (Act). At least an additional 36 mussels are considered globally imperiled (Williams et al. 1993). Thirteen species known from the region are now considered to be extinct (Turgeon et al. 1998). Numbers of imperiled mussels continue to increase with the ongoing decline of faunal elements and their habitats. Dozens of major impoundments, episodic and chronic chemical spills, channelization, and sedimentation have contributed to the demise of this extraordinary fauna (Williams et al. 1993, Parmalee and Bogan 1998).

Historically, as many as 71 mussel species were present in BISO and currently only 26 species have been found. Funded projects will transfer remnant populations of these species found outside of the park, but in marginal habitats, to the more suitable habitat in BISO and restore them to the park. Additionally, our partners operate artificial propagation programs and will donate help to augment natural reproduction. This effort is consistent with National Park Service (NPS) Management Policies (2001) to restore extirpated native species and recover all endangered species that belong in a park unit. Management policies 2001 states, in part: "Undertake active management to restore and maintain listed species, and re-establish extirpated populations as necessary to maintain species and habitats upon which they depend" (section 4.4.2.3). Recently the state wildlife agency discovered remnant populations of extirpated mussels existing below tailwaters from impoundments along the Cumberland River. These specimens were in a state of very cold existence, alive, not feeding very much and not reproducing. When the specimens were brought out to normal conditions, they began breeding and otherwise behaving normally. This condition describes poikiotherms, animals whose body temperature are subject to the various outside temperatures. Gametogenisis is not occurring in the animals that are below the outfall of impoundments because the temperature is too low. These animals thrive in free-flowing rivers. Four endangered species that were extirpated from the park are in these mussel beds. The state wildlife agency has no where to put these organisms with suitable habitat, except the middle reaches of BISO on the main river. This project proposes to restore the native fauna that was extirpated by harvesting the stranded specimens, and propagating them. We will also propagate the endangered species currently existing in the park. An E.A. with a FONSI was prepared with an approved plan to re-introduce the 45 species that were once present at BISO. This document presents a proposal to restore the mussel fauna of the free-flowing reach of the Big South Fork of the Cumberland River (BSF) in BISO, Morgan, Scott, and Fentress Counties in north-central Tennessee, and McCreary County in southeastern Kentucky. Specifically, the following actions are proposed (1) augment existing populations of six federally listed mussels--Cumberland bean (Villosa trabalis), Cumberlandian combshell (Epioblasma brevidens), oyster mussel (E. capsaeformis) , tan riffleshell (E. walkeri), little-wing pearlymussel (Pegias fabula), and Cumberlandian elktoe (Alasmidonta atropurpurea, (2) reintroduce historical populations of four federally listed mussels--clubshell (Pleurobema clava), cracking pearlymussel (Hemistena lata), dromedary pearlymussel (Dromus dromas), and orangefoot pimpleback (Plethobasus cooperianus). The proposed actions for the federally listed mussels are: (1) consistent with the purposes of the 1973 Endangered Species Act, as amended (Act), (2) compatible with the goal of the 1916 National Park Service Organic Act, and (3) identified as tasks in the U.S. Fish and Wildlife Services (FWS) approved recovery plans for these species. It is unlikely that these federally listed species can be reclassified from endangered to threatened or recovered and removed from the Acts protection without augmenting and expanding existing populations and reestablishing populations back into historical habitats like the BSF. Similar efforts for these and other federally listed, candidate, and non-listed mussels are underway in other southeastern river systems. This work will can be done in three years.

A recent status review of the 297 mussel species in the United States has revealed significant nationwide declines. A profound increase in federal listings of threatened and endangered species has occurred in recent years. Approximately 25 percent of the mussel fauna are now federally listed and 12 percent are extinct. No other group of animals in the United States approaches this level of imperilment. For a regional

perspective, it is readily apparent that the rain forest of mussel diversity is in the southeastern United States, which includes the Cumberland and Tennessee River systems. Of the 129 freshwater mussel species in the Tennessee and Cumberland Rivers, 40 species are federally protected. Mussels are sensitive to physical or chemical changes in habitat suitability, and are among the first to disappear under anthropogenic disturbance. Their presence and expanded populations offer opportunities to ecologically improve aquatic river systems (e. g., water quality and food webs) so that species can be recovered to the point of delisting from the federal list of endangered species. Big South Fork mussels are brood stock for these efforts. Their loss would eliminate all mussel recovery efforts for these species in the Cumberland River system.

North America's freshwater mussel fauna, particularly the fauna in the southeastern United States, is globally significant (Neves et al. 1997). T.A. Conrad wrote in a paper presented to the Academy of Natural Sciences of Philadelphia in 1834: "The great variety and beauty of the fresh water shells of this country are truly surprising. Whilst the streams of Europe contain very few species, not remarkable for elegance of color or variety, the rivers of Ohio, Kentucky, Tennessee, Alabama, etc., contain at least one hundred species of almost every imaginable shape."
Of the 297 mussel species known from U.S. waters, over 90 percent occur in the Southeast (Williams et al. 1993). Currently, nearly 25 percent of the Southeast's mussel fauna are federally listed and about 12 percent are extinct. No other native faunal group approaches this level of imperilment.

The States of Virginia and Tennessee, in cooperation with the FWS and the U.S. Geological Survey (USGS), have been actively pursuing mussel life history studies and developing mussel propagation and reintroduction technology for nearly 20 years with the aim of recovering this fauna. Progress in these research areas has been successful in recent years (e.g., fish hosts have been identified, endangered mussels have been reared in captivity and used to augment existing populations, non-endangered mussels have been successfully reintroduced and have reproduced in historical habitat). Additionally, through the efforts of the National Park Service (NPS), Environmental Protection Agency, State water resources and natural resources agencies, non-governmental conservation organizations (e.g., The Nature Conservancy, World Wildlife Fund, and local watershed restoration groups), industry, and municipalities, some rivers and river reaches that once supported a diverse mussel fauna have been restored sufficiently to again support mussels. Thus, the FWS and its many partners are poised to implement a major mussel recovery effort.

On February 26, 2001, representatives of several agencies [Tennessee Wildlife Resources Agency, Tennessee Department of Environment and Conservation, Kentucky Department of Fish and Wildlife Resources, Kentucky Division of Water, Kentucky State Nature Preserves Commission, FWS (Asheville, North Carolina and Cookeville, Tennessee field offices), USGS, and NPS (BISO and Obed Wild and Scenic River)] met at BISO headquarters, Oneida, Tennessee, to address restoring BSF's mussel biodiversity. All agencies represented supported the concept of initiating mussel recovery efforts in the BISO.

Currently, 26 species remain in the National Area including six that are federally protected --Cumberland elktoe (*Alasmidonta atropurpurea*), Cumberlandian combshell (*Epioblasma brevidens*), Cumberland bean pearlymussel (*Villosa trabalis*), oyster

mussel (*Epioblasma capsaeformis*)[1], tan riffleshell (*Epioblasma walkeri*)[2], and little-wing pearlymussel (*Pegias fabula*). Although the decline is considerable, recent mussel surveys indicate that the river is slowly recovering [Ahlstedt et al., 2003]. The river's recovery is also reflected in its fish fauna, which appears to be experiencing some degree of improvement (Dr. David Etnier, University of Tennessee, and Pat Rakes, Conservation Fisheries, Inc., personal communication 2001). Opportunities currently exist to begin recovering the mussel fauna in the Big South Fork and assist in the recovery of several federally endangered mussels.

Soils in the Plateau are chiefly formed from parent material and, consequently, are sandy loams that are fairly well drained. Silt loams and residual clays occur on slopes and valley floors. Loess of western origin is nearly absent from the region (USDA 1981:2).

The Cumberland Plateau falls within the Cumberland and Allegheny section of the Mixed Mesophytic Forest region. It is described as one of the oldest and most complex associations of the eastern deciduous forests. Where the region is deeply dissected, typical dominant species include tulip, poplar, white and red oak, hemlock, basswood, beech, chestnut, and sugar maple. The old peneplain surface is dominated by oak or oak-hickory forest (Braun 1950:39,114).

Because of its higher elevation, the region maintains a temperate climate with average temperatures lower than the adjacent regions. General weather conditions are subject to microclimatic variation between areas. The annual mean temperature is 55 degrees Fahrenheit in the northern Plateau and about 4 degrees higher in the south. Precipitation averages about 50 inches per year, much of it as rain occurring from late winter through early spring. Snowfall averages about 10 inches per year (Ferguson and Pace 1981:7-10). For more information, please visit the National Park Service website at: http://www.nps.gov/biso

5.2.E. United States Army Corps of Engineers-Nashville District. The Nashville District, U.S. Army Corps of Engineers is one of seven districts in the Lakes and Rivers Division. The district's area is determined by the Cumberland River and the Tennessee River's watersheds and encompasses 59,000 square miles in portions of seven states. This geographic area is represented by 14 senators and 20 Congressional representatives. The Nashville District's missions include providing flood protection, recreation, hydropower, and navigation. The District also provides environmental stewardship through our Regulatory and Civil Works programs, conducts emergency response to disasters, and to performs other authorized Civil Works projects.

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[1]Both *Epioblasma capsaeformis* and *E. walkeri* have been reported from the Big South Fork, and the *Epioblasma* that currently exists in the Big South Fork shares characteristics with both species. Thus, because of taxonomic questions, it is unclear if it is one, both, or an undescribed species. DNA analysis is planned to help resolve this issue.

[2]See footnote 1.

Within the 18,000 square mile Cumberland River Basin, overall responsibilities for the Nashville District include operation and maintenance of 10 reservoir projects. Each of these is operated for some or all of the following purposes: hydropower production, flood control, navigation, water supply, water quality, fish and wildlife, and recreation.

Within the much larger, 41,000 square mile Tennessee River Basin the Nashville District operates a series of navigation locks and has regulatory permit authority over dredge and fill activities under the Clean Water Act and the Rivers and Harbors Act.

As of 2005, the District's flood control projects have prevented more than $1.96 billion in flood damages. The District also provides flood prevention planning assistance to the states and local governments.

Lakes in the Nashville District are the most popular in the nation. More than 36 million people visited our 10 lakes last year. These recreation users had an economic impact on the region of nearly $877 million dollars. Five Nashville District lakes rank among the top 25 in Corps-wide visitation. In 2000, the District's 70 commercial concessionaires produced $1.3 million in profit, and returned more than $300,000 to the U.S. Treasury in rent payments for leases.

The Nashville District has the capacity to produce more than 914 megawatts of clean electricity, enough to power the needs of a city the size of Nashville, at nine different hydropower generations plants in the Cumberland River Basin. The District generates about $44 million in revenue from the sale of this power annually. This revenue is returned to the U.S. Treasury.

The Nashville District operates and maintains 1,175 commercially navigable river miles; almost 10% of the total within the U.S. Army Corps of Engineers. The district operates and maintains 14 navigation lock projects; nine on the Tennessee River, four on the Cumberland River, and one on the Clinch River. There are more than 40,000 commercial and recreational lockages annually. More than 74 million tons of commodities passed through these 14 locks during 2005. Wilson Lock in Alabama has the highest single lift east of the Rocky Mountains, between 93 and 100 feet, depending on the current river water level.

Regulatory Program

The U.S. Army Corps of Engineers has been involved in regulating certain activities in the nation's water since 1890. Prior to 1968, the primary thrust for the regulatory program was the protection of navigation. As a result of new laws and judicial decisions, the program has evolved to one that considers the full public interest by balancing the favorable impacts against detrimental impacts. The Nashville District annually handles more than 3,000 regulatory actions, 97% of which were evaluated in less than 60 days.

Section 10 of the Rivers and Harbors Act of 1899 **-** requires approval prior to the accomplishment of any work in or over navigable waters of the United States, or which affects the course, location, condition or capacity of such waters. Typical activities requiring Section 10 permits are:

•Construction of piers, wharves, bulkheads, dolphins, marinas, ramps, and cable/pipeline crossings.
• Dredging and excavation

Section 404 of the Clean Water Act - requires approval prior to discharging dredged or fill material into the waters of the United States. Typical activities requiring Section 404 permits are:
• Depositing of fill or dredged material in waters of the U.S. or adjacent wetlands.
• Site development fill for residential, commercial, or recreational developments.
• Construction of revetments, groins, breakwaters, levees, dams, dikes, and weirs.
• Placement of riprap and road fills.

Civil Works Program

The Corps' ongoing Civil Works responsibilities date back to the early 1800's when Congress authorized the removal of navigation hazards and obstacles. Over the years, succeeding Administrations and Congresses have expanded the Corps' missions to include most all water-related planning, development, and construction areas where a Federal interest is involved. Funds for Congressionally Authorized Projects are provided through Energy and Water Appropriations Acts and through contributions from non-Federal entities for specific projects.

Civil Works projects may also be funded under the Continuing Authorities Program (CAP). Congress has provided the Corps with standing authorities to study and build specific water resources projects for specific purposes and with specified spending limits. CAP projects are usually implemented in a faster time frame, are limited in complexity, have Federal cost limits, are approved by the Division Commander, and do not need Congressional authorization.

Nashville District Corps of Engineers Water Quality Program

The Nashville District Corps of Engineers collects a significant volume of physical, chemical, and biological water quality data every year. These data are collected at representative points both within all ten Nashville District lakes, on various major and/or representative inflow streams, and in the tailwaters. Where there are known water quality problems, such as seasonal low DO in certain turbine releases, monitoring is significantly intensified to track and quantify a particular problem. This information is used to make informed decisions about how a project's powerplant should operate. Baseline, continuous recording, multiparameter water quality monitors keep track of conditions at critical points on the main stem of the Cumberland River from the mouth of the Obey River near Celina, Tennessee to the tailwater of Lake Barkley in western Kentucky. The monitor at the Old Hickory Dam tailwater, in particular, provides key information, since water discharged from Old Hickory must be able to absorb inputs from Nashville which is just downstream.

The data collected by the Nashville District are used to help determine watershed water quality trends and to provide for better management of the comprehensive reservoir

system. The data are essential for running predictive water quality models, a growing trend in Corps' water management practice.

Additional information concerning projects, programs, and activities of the Nashville District Corps of Engineers can be obtained on the World Wide Web at http://www.orn.usace.army.mil/

Environmental Education

Environmental education opportunities are provided to area school age children by the Nashville District Corps of Engineers. Water Quality personnel have participated in environmental awareness programs for the past several years at the majority of Nashville District lakes. These programs are organized by the local lake Resource Management staff and involve various area schools. The programs provided allow students to have a "hands on" experience in water quality surveillance techniques. Typically the programs include an interactive discussion of overall water quality issues. This is supplemented with demonstrations of sophisticated water quality instrumentation, collection and analysis of biological specimens from local aquatic environments, and viewing of reference materials and preserved specimens. The value of such environmental education is enormous, because it reaches young people early in their lives and exposes them to a scientific learning experience that is impossible to duplicate in a formal classroom. This experience hopefully contributes to a greater lifelong awareness by the individual of the importance of conserving and improving water quality and wise use of water resources.

Additional Information

To obtain additional information about the District, please refer to the home page at: http://www.lrn.usace.army.mil/, or contact the following offices:
Public Affairs Office (General Information): (615) 736-7161
Regulatory Branch: (615) 369-7500

5.3. STATE PARTNERSHIPS.

5.3.A. TDEC Division of Water Supply. The Source Water Protection Program, authorized by the 1996 Amendments to the Safe Drinking Water Act, outline a comprehensive plan to achieve maximum public health protection. According to the plan, it is essential that every community take these six steps:

1) Delineate the drinking water source protection area
2) Inventory known and potential sources of contamination within these areas
3) Determine the susceptibility of the water supply system to these contaminants
4) Notify and involve the public about threats identified in the contaminant source inventory and what they mean to their public water system
5) Implement management measures to prevent, reduce or eliminate threats
6) Develop contingency planning strategies to deal with water supply contamination or service interruption emergencies (including natural disaster or terrorist activities).

Source water protection has a simple objective: to prevent the pollution of the lakes, rivers, streams, and ground water (wells and springs) that serve as sources of drinking water before they become contaminated. This objective requires locating and addressing potential sources of contamination to these water supplies. There is a growing recognition that effective drinking water system management includes addressing the quality and protection of the water sources.

Source Water Protection has a significant link with the Watershed Management Program goals, objectives and management strategies. Watershed Management looks at the health of the watershed as a whole in areas of discharge permitting, monitoring and protection. That same protection is important to protecting drinking water as well. Communication and coordination with a multitude of agencies is the most critical factor in the success of both Watershed Management and Source Water Protection.

Watershed management plays a role in the protection of both ground water and surface water systems. Watershed Management is particularly important in areas with karst (limestone characterized by solution features such as caves and sinkholes as well as disappearing streams and spring), since the differentiation between ground water and surface water is sometimes nearly impossible. What is surface water can become ground water in the distance of a few feet and vice versa.

Source water protection is not a new concept, but an expansion of existing wellhead protection measures for public water systems relying on ground water to now include surface water. This approach became a national priority, backed by federal funding, when the Safe Drinking Water Act amendments (SDWA) of 1996 were enacted. Under this Act, every public drinking water system in the country is scheduled to receive an assessment of both the sources of potential contamination to its water source of the threat these sources may pose by the year 2003 (extensions were available until 2004). The assessments are intended to enhance the protection of drinking water supplies within existing programs at the federal, state and local levels. Source water assessments were mandated and funded by Congress. Source water protection will be

left up to the individual states and local governments without additional authority from Congress for that progression.

Tennessee's Wellhead Protection Rules were revised as of October 29, 2005 to include requirements for similar protection for public water systems using surface water sources under the heading of Drinking Water Source Protection Rule (1200-5-1-.34) in addition to the previous requirements for wellhead protection for public water systems using ground water sources. The rule addresses surface or ground water withdrawals in the vicinity of public water sources as well as potential contaminant sources threatening public water sources to reflect the amended prohibitions in the 2002 Amendments to the Tennessee Safe Drinking Water Act, TCA 68-221-771. There are additional reporting requirements of potential contaminant source inventories and emergency response for the public water systems as well. The Division of Water Supply will be able to use the Drinking Water Source Protection Rule to work in complimentary fashion with the Division of Water Pollution Control and other Departmental agencies in activities to protect public water sources.

As a part of the Source Water Assessment Program, public water systems are evaluated for their susceptibility to contamination. These individual source water assessments with susceptibility analyses are available to the public at http://www.state.tn.us/environment/dws as well as other information regarding the Source Water Assessment Program and public water systems.

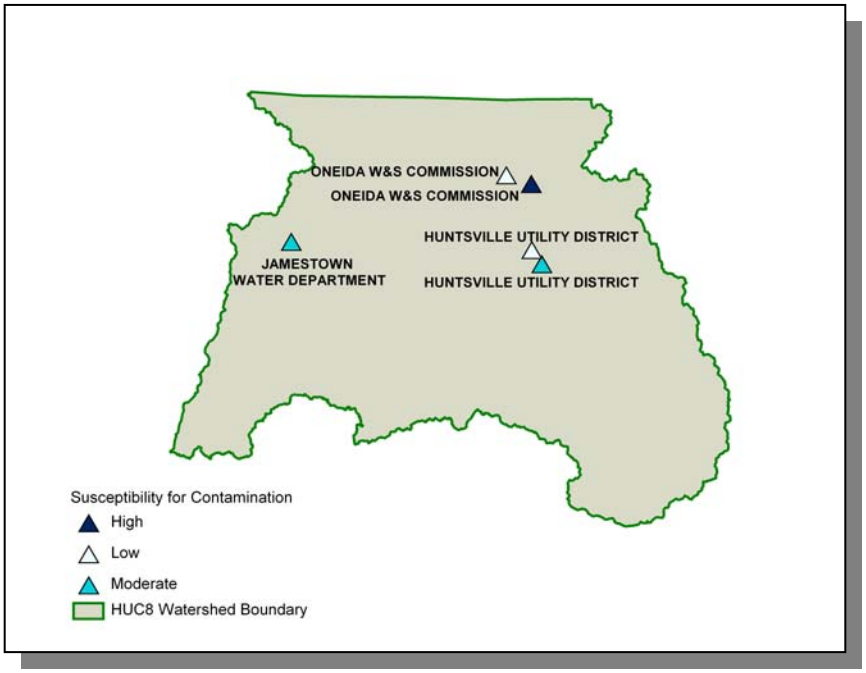

Figure 5-1. Susceptibility for Contamination in the South Fork Cumberland River Watershed.

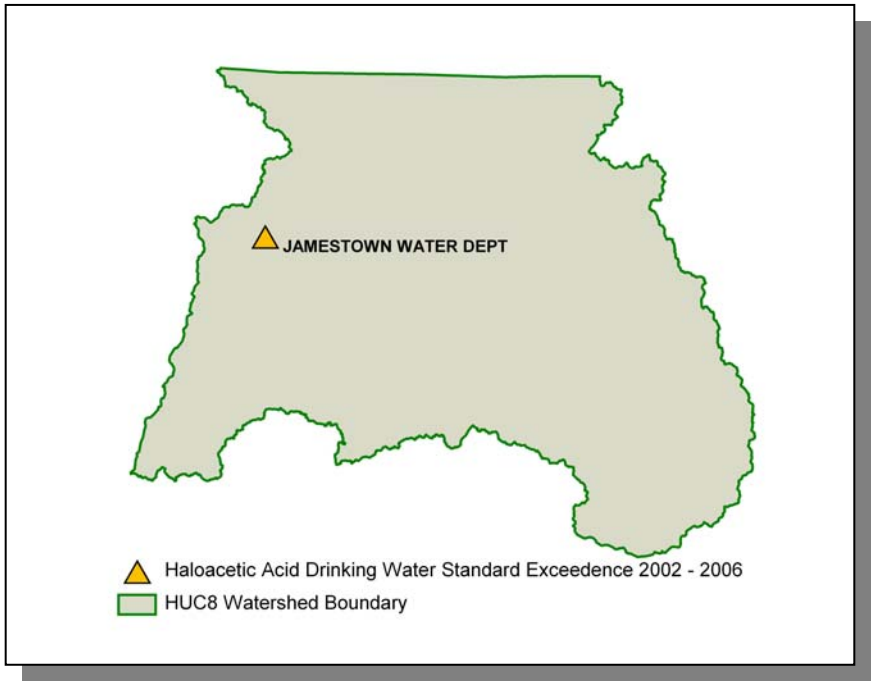

Figure 5-2. Exceedences of the Haloacetic Acid Drinking Water Standard in the South Fork Cumberland River Watershed.

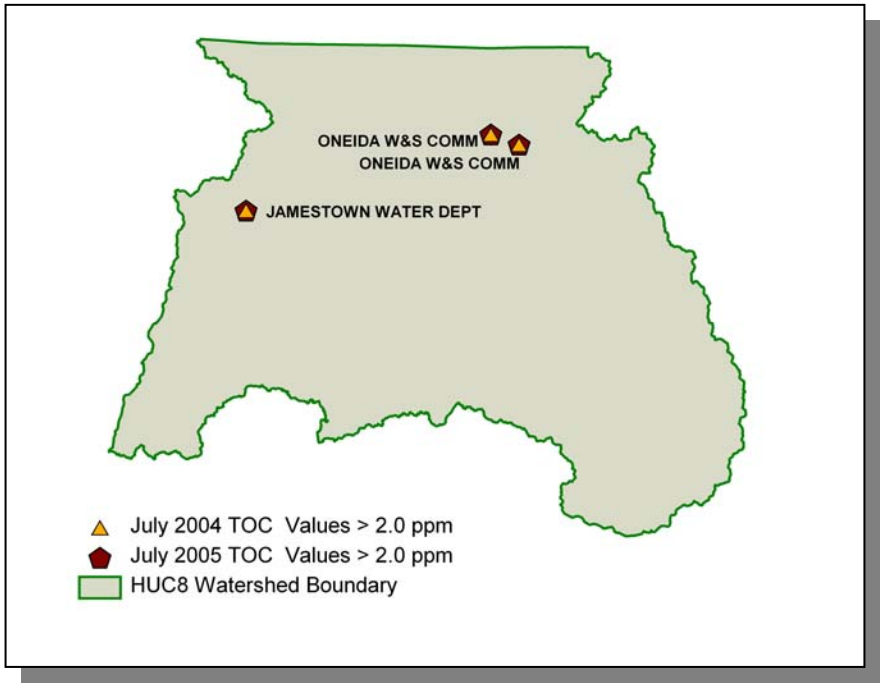

Figure 5-3. July 2004 and 2005 Raw Water Total Organic Carbon (TOC) Analysis in the South Fork Cumberland River Watershed.

For further discussion on ground water issues in Tennessee, the reader is referred to the Ground Water Section of the 305(b) Water Quality Report at http://www.tdec.net/water.shtml.

5.3.B. State Revolving Fund. TDEC administers the state's Clean Water State Revolving Fund Program. Amendment of the Federal Clean Water Act in 1987 created the Clean Water State Revolving Fund (SRF) Program to provide low-interest loans to cities, counties, and utility districts for the planning, design, and construction of wastewater facilities. The U.S. Environmental Protection Agency awards annual capitalization grants to fund the program and the State of Tennessee provides a twenty-percent funding match. TDEC has awarded loans totaling approximately $550 million since the creation of the SRF Program. SRF loan repayments are returned to the program and used to fund future SRF loans.

SRF loans are available for planning, design, and construction of wastewater facilities, or any combination thereof. Eligible projects include new construction or upgrading/expansion of existing facilities, including wastewater treatment plants, pump stations, force mains, collector sewers, interceptors, elimination of combined sewer overflows, and nonpoint source pollution remedies.

SRF loan applicants must pledge security for loan repayment, agree to adjust user rates as needed to cover debt service and fund depreciation, and maintain financial records that follow governmental accounting standards. SRF loan interest rates range from zero percent to market rate, depending on the community's per-capita income, taxable sales, and taxable property values. Most SRF loan recipients qualify for interest rates between 2 and 4 percent. Interest rates are fixed for the life of the term of the loan. The maximum loan term is 20 years or the design life of the proposed wastewater facility, whichever is shorter.

TDEC maintains a Priority Ranking System and Priority List for funding the planning, design, and construction of wastewater facilities. The Priority Ranking List forms the basis for funding eligibility determinations and allocation of Clean Water SRF loans. Each project's priority rank is generated from specific priority ranking criteria and the proposed project is then placed on the Project Priority List. Only projects identified on the Project Priority List may be eligible for SRF loans. The process of being placed on the Project Priority List must be initiated by a written request from the potential SRF loan recipient or their engineering consultant. SRF loans are awarded to the highest priority projects that have met SRF technical, financial, and administrative requirements and are ready to proceed.

Since SRF loans include federal funds, each project requires development of a Facilities Plan, an environmental review, opportunities for minority and women business participation, a State-approved sewer use ordinance and Plan of Operation, and interim construction inspections.

For further information about Tennessee's Clean Water SRF Loan Program, call (615) 532-0445 or visit their Web site at http://www.tdec.net/srf.

5.3.C. Tennessee Department of Agriculture. The Tennessee Department of Agriculture's Water Resources Section consists of the federal Section 319 Nonpoint Source Program and the Agricultural Resources Conservation Fund Program. Both of these are grant programs which award funds to various agencies, non-profit organizations, and universities that undertake projects to improve the quality of Tennessee's waters and/or educate citizens about the many problems and solutions to water pollution. Both programs fund projects associated with what is commonly known as "nonpoint source pollution."

The Tennessee Department of Agriculture's Nonpoint Source Program (TDA-NPS) has the responsibility for management of the federal Nonpoint Source Program, funded by the US Environmental Protection Agency through the authority of Section 319 of the Clean Water Act. This program was created in 1987 as part of the reauthorization of the Clean Water Act, and it established funding for states, territories and Indian tribes to address NPS pollution. Nonpoint source funding is used for installing Best Management Practices (BMPs) to stop known sources of NPS pollution, training, education, demonstrations and water quality monitoring. The TDA-NPS Program is a non-regulatory program, promoting voluntary, incentive-based solutions to NPS problems. The TDA-NPS Program basically funds three types of programs:

- BMP Implementation Projects. These projects aid in the improvement of an impaired waterbody, or prevent a non-impaired water from becoming listed on the 303(d) List.
- Monitoring Projects. Up to 20% of the available grant funds are used to assist the water quality monitoring efforts in Tennessee streams, both in the state's 5-year watershed monitoring program, and also in performing before-and-after BMP installation, so that water quality improvements can be verified. Some monitoring in the South Fork Cumberland River Watershed was funded under an agreement with the Tennessee Department of Agriculture, Nonpoint Source Program (U.S. Environmental Protection Agency Assistance Agreement C99944674-04-0).

- Educational Projects. The intent of educational projects funded through TDA-NPS is to raise the awareness of landowners and other citizens about practical actions that can be taken to eliminate nonpoint sources of pollution to the waters of Tennessee.

The Tennessee Department of Agriculture Agricultural Resources Conservation Fund Program (TDA-ARCF) provides cost-share assistance to landowners across Tennessee to install BMPs that eliminate agricultural nonpoint source pollution. This assistance is provided through Soil Conservation Districts, Resource Conservation and Development Districts, Watershed Districts, universities, and other groups. Additionally, a portion of the TDA-ARCF is used to implement information and education projects statewide, with the focus on landowners, producers, and managers of Tennessee farms and forests.

Participating contractors in the program are encouraged to develop a watershed emphasis for their individual areas of responsibility, focusing on waters listed on the Tennessee 303(d) List as being impaired by agriculture. Current guidelines for the

TDA-ARCF are available. Landowners can receive up to 75% of the cost of the BMP as a reimbursement.

Since January of 1999, the Department of Agriculture and the Department of Environment and Conservation have had a Memorandum of Agreement whereby complaints received by TDEC concerning agriculture or silviculture projects would be forwarded to TDA for investigation and possible correction. Should TDA be unable to obtain correction, they would assist TDEC in the enforcement against the violator. More information forestry BMPs is available at: http://tennessee.gov/agriculture/forestry/BMPs.pdf, and the complaint form is available at: http://tennessee.gov/environment/wpc/logform.php.

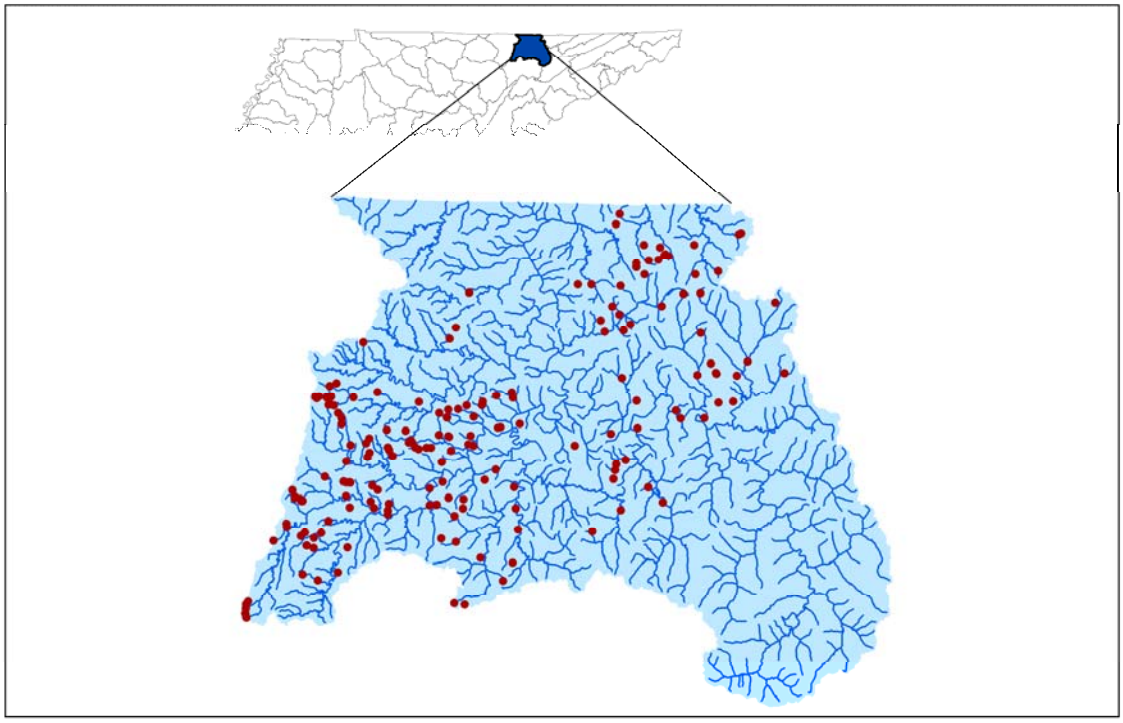

Figure 5-4. Location of BMPs installed from 1999 through 2005 in the Tennessee Portion of the South Fork Cumberland River Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. *More information is provided in Appendix V.*

5.3.D. Kentucky Division of Water – Kentucky Watershed Management Framework. The Kentucky Watershed Management Framework is a dynamic, flexible structure for coordinating watershed management across the Commonwealth of Kentucky.

The Watershed Management Framework is not a new program, but rather a way of coordinating existing programs and building new partnerships that will result in more effective and efficient management of the state's land and water resources. Inherent in the design of the Framework is the belief that many stakeholder groups and individuals must have ongoing opportunities to participate in the process of managing the abundant natural resources that characterize Kentucky's watersheds.

Benefits to the people of Kentucky include:

- Better information for decision making
- Increased ability to resolve complex water resource problems
- Improved coordination among governmental agencies
- More opportunities for citizens to get involved
- Increased ability to demonstrate results and benefits of environmental management
- More cost-effective use of public and private funds

Each major river basin in Kentucky is staffed with a Basin Coordinator. Basin Coordinators are staff assigned to serve as a liaison in a given basin management unit among the agencies, the local interests, and the resources concerns. Their job is to specialize in their watershed, to know what resources might be available to address the concerns, and facilitate the watershed process to implement plans that address the problems.

For more information about the KY Watershed Management Framework visit our website at http://www.watersheds.ky.gov/

Watershed Framework activities in the Big South Fork watershed are coordinated through the Upper Cumberland River Basin Team. The Upper Cumberland River Basin Team is a multi-agency task force that meets regularly to help in development of monitoring strategies, education and outreach, prioritization of issues and watersheds within the basin, planning, and networking among technical staff and local leaders to apply agency resources to implement fixes. For more info about the Upper Cumberland River Basin Team contact Rob Miller, Upper Cumberland River Basin Coordinator at (606) 878-0157 or via email at robert.l.miller@ky.gov. The web address is http://www.watersheds.ky.gov/basins/upper_cumberland/.

Big South Fork of Cumberland River

Big South Fork, below Bear Creek (05130104250)
Big South Fork above Bear Creek (05130104220)
Bear Creek, of Big South Fork (05130104240)
Rock Creek (05130104290)
Roaring Paunch Creek (05130104270)
Little South Fork (05130104310)

Sinking Creek of Big South Fork (05130104320)
Cedar Sinking Creek (05130104330)

Geography. The Big South Fork watershed in Kentucky is comprised of more than 400 square miles. The Big South Fork arises in north central Tennessee and flows northward into McCreary County. Along much of this flow the river cuts deep into the Pottsville Escarpment region of the Cumberland Plateau forming a 600-foot deep gorge. The river eventually joins the Cumberland River at Lake Cumberland near Burnside. The general topography is steep with high ridges and low hollows. The terrain is well-dissected and well-drained by deeply entrenched streams. Ridges are generally narrow and winding. Natural flat land is mainly restricted to flood plains of the main stem and major tributaries. Low-order streams are generally V-shaped and have no flood plains. The escarpment region is a transitional zone between the Cumberland Plateau and the Mississippian Plateau. Resistant sandstone and conglomerate have weathered to create sheer cliffs, steep-walled gorges, rock shelters, waterfalls, natural bridges and arches. The deepest sections of the gorge are located in Tennessee however much of the terrain in Kentucky is equally as treacherous with narrow ridges dropping off steep cliff lines to the river valley below. As the stream nears Lake Cumberland the cliff lines diminish to steep hillsides. In the northwest portion of the watershed the valleys contain significant karst drainage areas.

Waterways. There are about 800 miles of streams in the Kentucky portion of the watershed. Major tributaries include Roaring Paunch Creek, Bear Creek, Rock Creek, Cedar Sinking Creek, Sinking Creek, and Little South Fork, Cooper Creek, Alum Creek, Big Creek, Koger Creek, Wolf Creek and Lick Creek, Oil Well Branch, Troublesome Creek and Difficulty Creek.The lower section of the river below Yamacraw is inundated by the backwater of Lake Cumberland much of the year.

A 10.2- mile segment of the Big South Fork above Roaring Paunch Creek is Outstanding National Resource Water due to the presence of federally endangered Cumberland Bean mussel (*Villosa trabalis*), Cumberland Elktoe mussel (*Alasmidonta atropurpurea*) and the Duskytail Darter (*Etheostoma percnurum*).

Rock Creek from White Oak Creek to the state line is Outstanding State Resource Water due to the presence of federally endangered Cumberland Elktoe mussel (*Alasmidonta atropurpurea*). In addition, this same segment is designated as a State Wild River.

There are 10.4 miles of the main stem of the Little South Fork designated as State Wild River. The stream is also Outstanding State Resource Water due to the presence of the Cumberland Bean mussel (*Villosa trabalis*).

The entire watershed upstream of Big Creek is part of the Source Water Protection Area for McCreary County Water District.

Land cover\land use. The entire stretch of the main stem above Koger Creek is within the Big South Fork National River and Recreation Area. Also the majority of the watershed falls within the Daniel Boone National Forest proclamation boundary with a large portion of the land in Forest Service ownership. In addition, 8700 acres of the lower watershed are part of the Lake Cumberland Wildlife Management Area. Because much of the land is not privately owned, the watershed is not densely populated.

Exceptions to this would be along the US 27 highway corridor and near the towns of Whitley City and Stearns. The watershed is covered with mostly mixed forest with some patches of deciduous or evergreen forest. There are several areas throughout the watershed that are reclaimed from historical surface mining.

Agency Data Assessment. During the 2000 water quality assessment the following stream reaches were assessed.

- A 5.6-mile segment of the Big South Fork downstream of Bear Creek was assessed for fish, macroinvertebrates, algae and water quality. The segment was judged fully supporting for aquatic life.
- The Copperas Fork tributary was assessed for macroinvertebrates and was judged not supporting for aquatic life and primary contact recreation.
- A 5.6-mile segment from Bear Creek to the Tennessee state line was assessed for fish, macroinvertebrates and algae. The segment was judged fully supporting for aquatic life.
- Difficulty Creek was assessed for fish and judged fully supporting for aquatic life.
- The lower 3.2 miles of Bear Creek were assessed for fish and macroinvertebrates. The segment was judged not supporting for aquatic life.
- The lower 7.8 miles of Roaring Paunch were assessed for fish, macroinvertebrates, and algae. The segment was judged fully supporting for aquatic life.
- Coffey Branch was assessed for macroinvertebrates and was judged fully supporting for aquatic life.
- The main stem of Rock Creek was assessed in three segments for a total of 16.4 miles. The lowermost segment is 4.1 miles long and was assessed for fish, macroinvertebrates and algae. This segment was judged partially supporting for aquatic life. The next segment is 7.0 miles long and was assessed for fish and macroinvertebrates. This segment was judged fully supporting for aquatic life. The uppermost segment was assessed for fish, macroinvertebrates, algae and fish tissue. This segment was judged fully supporting for aquatic life but only partially supporting for fish tissue consumption due to mercury.
- Puncheoncamp Branch and Watts Branch were assessed and judged fully supporting for aquatic life.
- The Little South Fork was assessed in three segments for a total of 22.5 miles. All three segments were judged fully supporting for aquatic life. One segment was also assessed for fish tissue and was judged fully supporting for fish tissue consumption.

Watershed Efforts in the Big South Fork. Although no subwatersheds in the Big South Fork were selected by the Upper Cumberland River Basin Team as a priority watershed for watershed planning, it has none the less been a focus of numerous projects. Several factors including strong local interest in source water protection, two State Wild Rivers, numerous endangered species and natural beauty have played a major role.

- **Rock Creek Task Force –** Multi-agency task force created to address acid mine drainage problems in lower Rock Creek watershed. The task force acquired funding from several sources including EPA Clean Water Action Plan funds, Appalachian Clean Streams Initiative, East Kentucky PRIDE and Trout Unlimited. For more info about the project http://www.aml.ky.gov/projects/Rock_Creek.htm

- **Source Water Assessment for McCreary County Water District -** Conducted as a follow up to state efforts for source water assessment. Partnership between McCreary County Water District, Western Kentucky University and Kentucky Rural Water Association. Water District recently received EPA 319h funding for development of watershed based plans in three subwatersheds of the Big South Fork.
- **Big South Fork Watershed Association -** Development of joint state watershed association.
- **Upper Cumberland Watershed Watch -** Through the recruiting efforts of the Big South Fork Watershed Association and the McCreary County Water District the Upper Cumberland Watershed Watch now has more than a dozen active volunteer samplers in the Big South Fork watershed. The samplers are scattered across the watershed in both Kentucky and Tennessee.
- **Joint Kentucky/Tennessee Water Quality Project** – The Big South Fork watershed was identified as a priority area for both states to work together on source water protection.

5.4. LOCAL INITIATIVES.

5.4.A. The South Fork Watershed Association. The South Fork Watershed Association (SFWA) is a bi-state collaboration of federal, state and local agencies, as well as community involved citizens. The SFWA is in the process filing for a TN Charter and 501(c)(3) nonprofit IRS status.

The SFWA's mission

(1) To enhance the long term attractiveness and health of the South Fork Watershed by appropriate voluntary citizen action through:

(A) Promoting exchange of information on the Watershed resources.

(B) Educating residents, tourists, businesses, developers, and government agencies in the South Fork Watershed:
1) To preserve or improve water quality;
2) To recognize land use practices which negatively impact the watershed, and to avoid pollution of all kinds;
3) To protect and encourage wildlife, native fish populations, and riparian habitat;
4) To foster recreational use of parks and waterways;
5) To promote integrated development planning;
6) To encourage sustainable land and resource use; and
7) To promote the long term sustainability of water resources for drinking water and public health.

(C) Promoting cooperation between residents, businesses, developers, government agencies, social associations and educators which will diminish conflict over use or development of natural resources that could harm the watershed.

(D) Encouraging and facilitating research and studies which will provide information on potential risks to the watershed or sustainable development opportunities for Watershed users.

The SFWA is active with a number of project activities. The group is working to study the watershed and develop a source water protection plan for community drinking water. This watershed planning project is made possible by a grant from the TENNESSEE Department of Agriculture Nonpoint Source Program. SFWA also conducts an annual Bear Creek Clean-up, Nature Hikes, and educational programs in collaboration with the local Boys & Girls Club. Lynne Anderson serves as the part-time watershed coordinator for SFWA. The steering committee meets regularly and holds periodic educational programs. For more information contact Lynne at SFWA, P.O. Box 490, Helenwood, TN 37755, lynnetec2002@yahoo.com, phone 423-663-4540.

5.4.B. The Cumberland River Compact. The mission of the Cumberland River Compact is to enhance the water quality of the Cumberland River and its tributaries through education and by promoting cooperation among citizens, businesses, and agencies in Kentucky and Tennessee.

We are a unique non-profit group that believes we can have both a strong economy and a healthy environment. The Compact is made up of businesses, individuals, community organizations and agencies working in the Cumberland River watershed. Over 2 million people share this watershed. Compact members work with all interested organizations and individuals to help ensure that our rivers and streams continue to provide us with clean water,bountiful crops, healthy fisheries and abundant recreational opportunities.

Since 1997, the Compact has set out to create a Watershed Outreach Program in each of the 14 watersheds that make up the Cumberland Basin. Members and staff of the Compact work with local communities to develop watershed forums where citizens can come together to learn more about their watershed and participate in developing a shared vision for the future. We welcome your interest and participation in this challenging project.

For more information about the Cumberland River Compact and to learn more about your local watershed, contact us at info@cumberlandrivercompact.org ;615-837-1151 or join us on the web at http://www.cumberlandrivercompact.org.

5.4.C. The Nature Conservancy (TNC). The Tennessee State Wildlife Action Plan (SWAP), formerly known as the Comprehensive Wildlife Conservation Strategy (CWCS), was developed by the Tennessee Wildlife Resources Agency with assistance from The Nature Conservancy in 2005. Congress mandated that each state and territory in the United States develop a SWAP as a requirement for continued receipt of federal State Wildlife Grant funding. These plans require the completion of 8 key elements of wildlife planning: 1) a list of animal species of greatest conservation need, 2) information about the distribution and abundance of species targets, 3) locations and relative conditions of key habitats, 4) descriptions of problems affecting target species and their habitats, 5) descriptions of conservation actions and priorities for conserving target species and habitats, 6) details for monitoring target species, conservation actions, and adaptive

management, 7) discussion of plans to review the SWAP at specific intervals, and 8) information about coordination and implementation of the SWAP with major stakeholders. In Tennessee, the SWAP was integrated into a spatial model using Geographic Information Systems (GIS) and other database technology. Priority aquatic, terrestrial, and subterranean areas for conservation were identified across the state. Priorities were determined in the GIS model based upon relative differences in species rarity, population viability, and potential mobility of species across habitat units. Priority problems affecting species and needed conservation actions are detailed across each region of the state.

For complete information about the Tennessee SWAP, please visit http://www.state.tn.us/twra/wildlife/cwcs/cwcsindex.html to read or download the full report.

Contact:
Chris Bullington
State Conservation Planning Manager
The Nature Conservancy, TN Chapter
2021 21st Avenue South; Suite C-400
Nashville, TN 37212
phone: (615) 383-9909 x 227

5.4.D. Hull-York Lakeland Resource Conservation and Development (RC&D) Council.
The RC&D Council mission is to *"Provide leadership to local communities to improve quality of life and conserve natural resources by organizing partners and facilitating technical and financial assistance resources".*

Hull-York Lakeland RC&D Council covers 14-counties of the Upper Cumberland area. These counties are: Macon, Clay, Pickett, Fentress, Overton, Jackson, Smith, DeKalb, Putnam, Cumberland, White, Van Buren, Warren and Cannon. Recreation in this area is dependant on a high standard of water quality. The main recreational attractions in the RC&D area are Dale Hollow Lake, Center Hill Lake, Cordell Hull Lake, and the scenic trout waters of the Caney Fork River. These resources attract large numbers of visitors to the area each year, and Hull-York Lakeland therefore has a vested interest in insuring the water quality of its watersheds.

Hull-York Lakeland RC&D Council has many local, state, federal and private partners with similar interests in the RC&D area. These partners join forces to engage in programs and projects that help individual land users and communities improve and conserve the natural resources, and engage in projects that enhance community and economic development activities. Hull-York Lakeland was the first RC&D area authorized by USDA in the state of Tennessee, and one of the first in the nation. Hull-York Lakeland was authorized in 1966.

Past projects have included Cane Creek Park and Lake in Putnam County, Camp Discovery in Jackson County, farmers markets is several counties, and emergency services consolidation projects. Current projects include a 319(h) grant for development of a watershed management plan in the Post Oak Creek Watershed. This watershed is

16,000+ acres and has been identified on the Tennessee 303(d) list of impaired waters as not meeting intended uses due to agriculture. The RC&D Council's goal is to develop a plan that identifies needs and problems in the watershed in order to have it removed from the 303(d) list, and then submit a project for funding practices that address those needs and problems.

Hull-York Lakeland RC&D Council has received a grant from the Tennessee Department of Agriculture – Agriculture Resources Conservation Fund (TDA – ARCF) with which they have purchased a tree planter in order to promote tree planting in riparian corridors to improve and enhance water quality. The Council has also received grants from TDA-ARCF, TWRA, and Quail Unlimited in order to purchase a Native Warm Season Grass No-Till Drill. This drill was purchased in May 2006 to promote the planting of Native Warm Season Grasses in the Upper Cumberland Area to create and enhance wildlife habitat, as well as establish buffers and field borders to improve water quality.

In 2006 Hull-York Lakeland has so far received $108,442 in direct grants, and has assisted communities in the receipt of $445,692. These funds are being used to address water quality and community development issues. For more information about Hull-York Lakeland RC&D Council contact Jeff Sanders at (931) 528-6472, ext. 110, or jeff.sanders@tn.usda.gov. You can also go to the council's website at: http://www.hylrcd.org.

5.4.E. Cumberland Mountain Resource Conservation and Development (RC&D) Council.

The RC&D program is a United States Department of Agriculture (USDA) program administered by the Natural Resources Conservation Service. This program helps people on a local level, with the assistance of a Federal Coordinator, to work together with many local organizations, county and city governments and conservation districts to implement natural resource protection and community development. Once a specific area has been authorized by the Secretary of Agriculture, that area is eligible for assistance through its RC&D council.

RC&D council projects involving water are designed to help improve surface and groundwater quality and quantity. Projects may include watershed management; construction or rehabilitation of irrigation, flood control and water drainage systems; construction or rehabilitation of aquaculture, wastewater treatment and purification systems; installation of buffer strips; and efficient use of aquifers.

The Cumberland Mountain RC&D council area includes five Tennessee counties: Anderson, Campbell, Morgan, Roane and Scott.

For more information please contact Alan Neal, coordinator, at alan.neal@tn.usda.gov.